

The Department of Mechanical Engineering presents:

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11:10AM-12:00PM

Bourns Hall A265

Modeling and Characterization of SiGe Nanocomposite

Abstract:

Direct energy conversion between thermal and electrical energy based on thermoelectric effects is attractive for potential applications in waste heat recovery and environmentally-friendly refrigeration. The energy conversion efficiency depends on the dimensionless figure of merit of thermoelectric materials, ZT , which is proportional to the electrical conductivity, the square of the Seebeck coefficient, and the inverse of the thermal conductivity. Currently, the low ZT values of available materials restrict the efficient applications of this technology. Recently, significant enhancements in ZT have been reported in nanostructured materials such as superlattices mainly due to their low thermal conductivities. The reduced thermal conductivity of nanostructures is mainly attributed to the large number of interfaces at which phonons are scattered. Based on this idea, nanocomposites are expected to have a lower thermal conductivity than their bulk counterparts with low fabrication cost just by mixing nano sized particles. This talk will discuss mechanisms of thermoelectric transport via modeling and provide experimental evidence on the enhancement of thermoelectric figure of merit in SiGe nanocomposites.

Bio: Dr. Hohyun Lee received his Ph.D. degree in Mechanical Engineering from the Massachusetts Institute of Technology in 2009. His research interests include charge & energy transport phenomena in nanostructures, temperature management in thermal systems, energy harvesting for health monitoring devices, and water purification. Currently, he is an Assistant Professor in the Department of Mechanical Engineering at Santa Clara University.

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